

Applicant: Steinemann, S.  
Application Serial No.: 10/750,446  
Filing Date: December 31, 2003  
Docket No.: 1409-2 RCE/CON  
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## **REMARKS/ARGUMENTS**

### **Section 103 Rejections**

Claims 11-15, 17-19, and 21 have been rejected under 35 U.S.C. §103(a) as unpatentable over GB 1,305,879 ("GB '879"). These rejections are respectfully traversed.

GB '879 discloses an implant made of an alloy, which consists of between 25% and 75% by weight of zirconium, the remainder consisting of titanium and at most 3% of other elements. In the table on page 2, measured examples of the properties are given, which are important in regard to use as an implant. Values such as the strength data for different binary Ti/Zr alloys are given. The strength data of the worked and annealed metal for a Ti 15/Zr alloy is 70 kg/mm<sup>2</sup> (700 MPa). This value is depending on the cooling method to obtain the alloy. The table on page 2 of the GB '879 shows the full range of Ti/Zr alloys. Included are examples of alloys including Ti 100%/Zr 0% to Ti 0%/Zr 100%. However, not all disclosed alloys were deemed suitable for implants by GB '879. In order to obtain a good implant, the strength data of the worked and annealed metal should be in the range of 780 MPa to 880 MPa. Therefore, reading these values, a person skilled in the art would have read that the alloy includes preferably between 35% and 75% by weight zirconium and the remainder including titanium and at most 3% of other elements.

The present claims are directed to a binary Ti/Zr alloy including less than 25% by weight zirconium. GB '879 teaches that an alloy including less than 25% by weight zirconium is not suitable for the preparation of an implant. Therefore, GB '879 teaches away from the preparation of an alloy including less than 25% by weight zirconium as set forth in the present

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claims. Reconsideration and withdrawal of the rejections in view of GB '879 are appropriate and respectfully requested.

Claims 11-21 have also been rejected under 35 U.S.C. §103(a) as unpatentable over GB '879 in view of Chem Ab. No. 103239 ("CA '239) and U.S. Patent No. 5,169,597 to Davidson ("US '597"). This rejection is respectfully traversed on the grounds that the combination of GB '879 with CA '239 and US '597 fails to establish a *prima facie* case of obviousness for failing to establish every element of the present invention.

CA '239 teaches titanium alloys for implants including 5-20% Zr, 10-20% Sn, 4-8% Nb, 2-4% Ta and 0-0.2% Pd. These alloys were forged in their alpha and alpha-beta regions followed by annealing at 975 K (700°C) for 7.2 ks (i.e. 2 hours).

In contrast to the present invention, the cooling of the alloy as set forth in CA '239 is not rapidly, but slowly. There is no teaching that the alloy may be prepared by a rapid cooling method. Furthermore, if a person skilled in the art would combine the teachings of GB '879 with the teachings of CA '239, he would not obtain a binary titanium zirconium alloy having a single phase.

US '597 teaches a biocompatible titanium alloy including 10-20% or 35-50% niobium and up to 20% zirconium. In column 5, lines 22 to 26, US '597 teaches that these hot rolling, cooling, reheating and quenching steps develop the cast alloy into a wrought material having finer grain than the as cast or powder metallurgically prepared alloy which renders it more suitable for use as an implant. However, as set forth at column 5, lines 50-57, niobium acts to stabilize the  $\beta$ -phase of the titanium alloys since it is the  $\beta$ -phase isomorphous phase stabilizer.

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Therefore, a person of skill in the art following the teachings of GB '879 and US '597 would be led to add niobium to obtain the  $\beta$ -phase and the  $\alpha$ ,  $\beta$ -phase.

Further, in contrast to the binary alloys of the present invention, ternary alloys as in US '597, **never form a single-phase system**. Therefore, the teachings of US '597 are not properly combinable with the teachings of GB '879, which is a binary single-phase system. However, assuming, *arguendo*, a person combined the teachings of GB '879 and US '597, the result would be a ternary alloy which necessarily includes at least two phases. A binary single phase alloy, as in the present invention, would not result.

Therefore, reconsideration and withdrawal of the rejections over GB '879 in combination with CA '239 and US '597 are appropriate and respectfully requested.

For the reasons set forth above, there is no motivation in any of the references to combine the teachings of each. Even if combined, the references would not lead one of ordinary skill in the art to prepare the invention of the present claims.

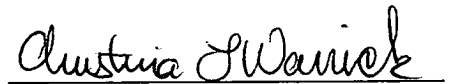
In view of the above amendments and remarks, Applicants respectfully submit that the present application is now in condition for allowance. Favorable action thereon is respectfully requested.

The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication, or credit any overpayment, to Deposit Account No. 08-2461.

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Should the Examiner wish to discuss this application in further detail, the Examiner is invited to contact Applicant's undersigned attorney by telephone at (973) 331-1700.

Respectfully submitted,

A handwritten signature in cursive script, reading "Christina L. Warrick", written in black ink.

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